# In-situ sol-gel synthesis of titanium dioxide-graphene oxide heterostructures for water purification technologies

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**ABSTRACT BODY:**
**Abstract Body:** Titanium dioxide-graphene oxide (TiO2-GO) heterostructures presents superior photocatalytic properties, due to their efficient use of the solar light and to their ability to adsorb water pollutants . However, the synthesis of such heterostructures often involves tedious experimental steps, the reaction mechanisms of which are not well understood yet. In this context, we developed and optimized a synthetic path for the preparation of TiO2-GO heterostructures with large interphase and strong interaction between GO (or reduced GO) and TiO2. TiO2 nanoparticles were synthesized by in-situ sol-gel reaction. Synthetic conditions (pH and temperature) were optimized to enhance the interface interaction between TiO2 and GO.The new materials were characterized by XRD, SEM and TEM analysis, besides the study of Ti-O-C interface bonding was carried out by XPS. In addition, the impact of the GO loading (0.01, 0.5, 1, 2, 5, and 10 wt.%) on the photocatalytic performances of TiO2 was studied with model pollutants.Lastly, band gab energy and UV-VIS diffuse reflection were conducted to observe the degree of TiO2-GO composites which works under the visible light.
**KEYWORDS:** TiO2-GO heterostructures , photocatalytic property, interface bonding.